

ÆNIGMATISTES AFRICANUS, a new Genus and Species of Diptera.

By R. SHELFORD, M.A., F.L.S.

(PLATE 22.)

[Read 7th November, 1907.]

QUITE recently, Professor E. L. Bouvier of the Muséum d'Histoire Naturelle, Paris, entrusted to me for examination a minute insect from British East Africa, bearing a superficial resemblance to a cockroach. The unique specimen was gummed on to a piece of card, so that little could be made out of its external anatomy when examined with a simple pocket-lens; however, when the specimen had been soaked off the card and placed under a microscope, it was at once seen that it had no affinities with the Orthoptera. I am indebted to Dr. H. J. Hansen of Copenhagen, whom I was fortunate enough to meet in London, for giving me a clue to the real nature of the insect. There can be little doubt that the insect's nearest known ally is *Ænigmatias blattoides*, an aberrant Phorid fly described by Meinert from Denmark [1*] in 1890; but the relationship, as might be expected from the very different localities of the two insects, is not at all close, in fact the differences between them are almost as striking as the resemblances. The following is a description of the new genus:—

ÆNIGMATISTES †, gen. nov.

Head prominent, subpyramidal; the morphologically anterior part lies in a plane almost at right angles to the plane of the posterior part and the middle region of the frons is produced and sharply ridged, making the angulation more pronounced. The head when viewed from above is concave and the vertex projects above the level of the pronotum. The frons immediately below the ridge is slightly concave, but then becomes strongly convex. On either side of the head is situated a deep depression in which lies the antenna.

The *eyes* have few facets, are somewhat pyriform in outline, and are placed laterally at the postero-ventral angles of the head (Pl. 22. fig. 3). A stout seta, upwardly curved, springs from a point just below each eye. *Ocelli* absent.

The *antennæ* (Pl. 22. fig. 4) are composed of 7 visible joints. The first is large, swollen and trapezoidal, the third is large and globular; the second is a connecting joint between the first and third and in surface view appears to be short and slender, in optical section it appears to expand within the

* These numbers refer to the Bibliography at the end of this paper.

† *ἀινγματιστής*, one that propounds riddles.

third joint. The remaining joints form a slender flagellum, the last joint being very long and lash-like.

The *mouth-parts* are much reduced and consist of (1) a trapezoidal and strongly deflexed labrum; (2) a pair of two-jointed maxillary palpi, the first joint minute, membranous, the second elliptical, hirsute; (3) a minute, membranous hypopharynx with a bifid apex directed inwards and overlying the entrance to the pharynx (Pl. 22. fig. 5). There is no *labium*.

Thorax of three segments: the pronotum large and crescentic; the mesonotum lenticular in outline; the metanotum with the anterior margin concave, the posterior margin straight. The mesonotum is enclosed between the pro- and metanotum and fails to reach the lateral margins of the thorax; the lateral borders of the other thoracic tergites overlap on to the ventral surface. Ventrally the cuticle is thin and membranous and only shows faint traces of sternal sclerites; a fine suture runs down the middle line of the ventral surface. An inwardly-directed seta springs from the antero-lateral margin of the pronotum.

Abdomen of four segments; the first three tergites transverse and shorter than the last which is subtriangular; the lateral borders of the first three overlap on to the ventral surface, which is covered with a thin, membranous cuticle showing no signs of segmentation.

Legs.—*1st pair*. Coxæ elongate, broad, flattened, the coxal cavities small, circular and widely separated; femora flattened, about equal in length to the coxæ but narrower; tibiæ almost cylindrical, about $\frac{2}{3}$ length of femora, with one spine at the apex; tarsi 5-jointed, the last joint with two claws, no pulvilli.

2nd pair. Coxæ trapezoidal, excavate and flanged on the outer aspect; femora longer and broader than those of the first pair, their lower margin sinuate towards apex; tibiæ cylindrical, equal in length to the femora, with three spines at the apex; tarsi similar to the first pair but more spinose.

3rd pair. Coxæ narrower and more elongate than the preceding pair; femora broader; tibiæ tapering from apex to base, with six spines at the apex; [tarsi missing].

Æ. AFRICANUS, sp. nov. (Pl. 22. figs. 1 & 2.)

Depressed, convex above. Piceous above, pale testaceous below; antennæ pale testaceous. Minutely punctate above and with a fine recumbent pubescence which extends also on to the legs.

Total length 2.5 mm.

Hab. Kisumu, Victoria Nyanza, Brit. Central Africa (*Ch. Alluaud*, 1904). Type in the Paris Museum.

I cannot be certain of the sex of the specimen, but suppose it to be a female; the unique specimen of *Ænigmatias blattoides* is considered by Meinert to be a female, though Coquillett [5] throws doubt on this and

regards a specimen of another species, *Æ. Schwarzii*, taken recently in Arizona, as a male. Until sufficient material for dissection is obtained it is not possible to settle the question of the sexes of these aberrant Diptera with any degree of certainty. It has been suggested that *Platyphora Lubbocki*, Verrall, is the male of *Ænigmatias blattoides*, but this is open to very considerable doubt.

Attention may be drawn here to some other remarkable Diptera which Brues [9], a leading authority on the Phoridae, considers ought to be retained in that family; he promises in the near future a paper treating of the relations of these aberrant forms to more normal types.

In 1897 Dahl [2] described from the Bismarck Archipelago a wingless fly, found on carrion and also on an Aroid, with an offensive odour, of the genus *Amorphophallus*. This insect, on account of a very superficial resemblance to a flea, was regarded as intermediate between the fleas and true flies, was named *Puliciphora lucifera*, and was made the type of a new family Puliciphoridae. Wandolleck [3] subsequently re-examined Dahl's specimen, and described in some detail its anatomy together with that of another species from the Bismarck Archipelago—*Chonocephalus dorsalis*—and of a third from Liberia, a form parasitic on land-molluscs of the genus *Achatina*. The last species, though described, was not named by Wandolleck, but has since been named *Wandolleckia Cooki*. Wandolleck, in his memoir on these three species, heaps scorn on Dahl's view of their affinities, re-christens *Puliciphora lucifera* as *Stethopathus ocellatus* and the Puliciphoridae as Stethopathidae. Though there cannot be the slightest doubt that these Diptera have no real affinity with *Pulex*, the rules of priority in nomenclature forbid the supplanting of a valid name, however great the absurdity that is so commemorated; *Stethopathus ocellatus*, Wand., must consequently sink as a synonym of *Puliciphora lucifera*, Dahl. Breddin and Börner [6] described in 1904, under the name of *Thaumatoxena Wasmanni*, a remarkable insect found in a termite's nest in Natal; this they consider to be not only the type of a new family Thaumatoxenidae, but also the type of a new sub-order of Rhynchota, the Conorrhyncha. Börner later [7] discussed the relation of this insect to the other orders of Hexapoda. Silvestri [8] in 1905 published an account of another species of the same genus, *Th. Andreinii*, and came to the conclusion that the genus is referable to the family Puliciphoridae (= Stethopathidae of Wandolleck). The insect is very remarkable in appearance, the abdomen being covered above and below with a single large scutum, three minute telescope-like segments alone projecting from the ventral surface towards its apex; but the antennae are typically Phorid in character, and the mouth-parts, judging from figures, are sufficiently like those of *Puliciphora*, *Chonocephalus*, and *Wandolleckia* to warrant a belief that *Thaumatoxena* is merely an extreme modification of the Phorid type, brought about perhaps by its termitophilous

habits. Brues in his latest monograph on the Phoridae [9] does not include *Thaumatoxena*, but it is possible that he did not receive Silvestri's paper in time to draw his attention to the fact that the position of *Thaumatoxena* in the order Rhynchota was a very precarious one. Wasmann [4] has described some other termitophilous genera, *Termitoxenia* and *Termitomyia*, which he would include in yet another family, the Termitoxenidae; they appear to have some features in common with *Thaumatoxena*; Brues includes them in the Phoridae. Their development is very remarkable, since they undergo no metamorphosis, and *Termitomyia* is also viviparous.

Except in the shape of the head, which resembles the head of *Chonocephalus*, and in the form of the antennae, which is characteristically Phorid in appearance, *Enigmatistes* is very unlike all the foregoing genera. *Thaumatoxena* is a form apart, the most outlying member of all. The "Puliciphoridae" are characterized by the small thorax, swollen abdomen with thin cuticle and isolated scutes, and the long legs. Moreover, in all the genera enumerated above, the rostrum is prominent and is composed of easily recognizable and separate elements. In *Enigmatias* the rostrum has not been properly demonstrated, but if it exists it is certainly minute and rudimentary. Both in *Enigmatias* and *Enigmatistes* the head fits closely to the thorax, and in the latter genus, at any rate, it is incapable of much movement owing to its projection above the level of the pronotum; the labrum is deflexed and covers the entry to the mouth quite completely. In an attempt to raise the labrum of my specimen and examine the mouth-parts *in situ*, the head broke away from the thorax so that the position of the trophi was considerably disturbed. I am, however, confident that no portion of the mouth-parts was lost, and so can affirm with certitude that the proboscis or rostrum of *Enigmatistes* is represented by a minute membranous hypopharynx which is quite invisible until the labrum, covering it, is removed. This reduction of the mouth-parts alone is sufficient to remove *Enigmatistes* and *Enigmatias* from the neighbourhood of the other aberrant genera of Phoridae described above. It is difficult to see how the insect can feed, since it is provided merely with a pair of maxillary palpi and a rudimentary hypopharynx, and the same may be said of *Enigmatias blattoides*. *Æ. blattoides* was found in company with ants, and it has been suggested to me that it is fed by the ants thrusting their jaws into the mouth of their guest and regurgitating some liquid nourishment from their crops, very much as the Staphylinid beetle *Atemeles marginata*, Gravenh., is fed by ants. The suggestion was sufficiently ingenious to lead me to examine the mouth-parts of the Staphylinid in question, in the hopes of discovering at least some reduction thereof to lend support to this view, but I was doomed to disappointment, for the mouth-parts in this species are perfectly well-formed. Moreover, I cannot find an instance of the reduction of mouth-parts in any other myrmecophilous or termitophilous insects; and the fact that *Enigmatias Schwarzii* was not taken in the company of

ants almost disposes of the suggestion that these species have to be fed by attendant hosts. Unfortunately, nothing is known of the habits of *Ænigmatistes*; the unique specimen was found in a miscellaneous collection of insects sent to the Paris Museum by M. Ch. Alluaud.

The following are the characters in which *Ænigmatistes* resembles *Ænigmatias*:—

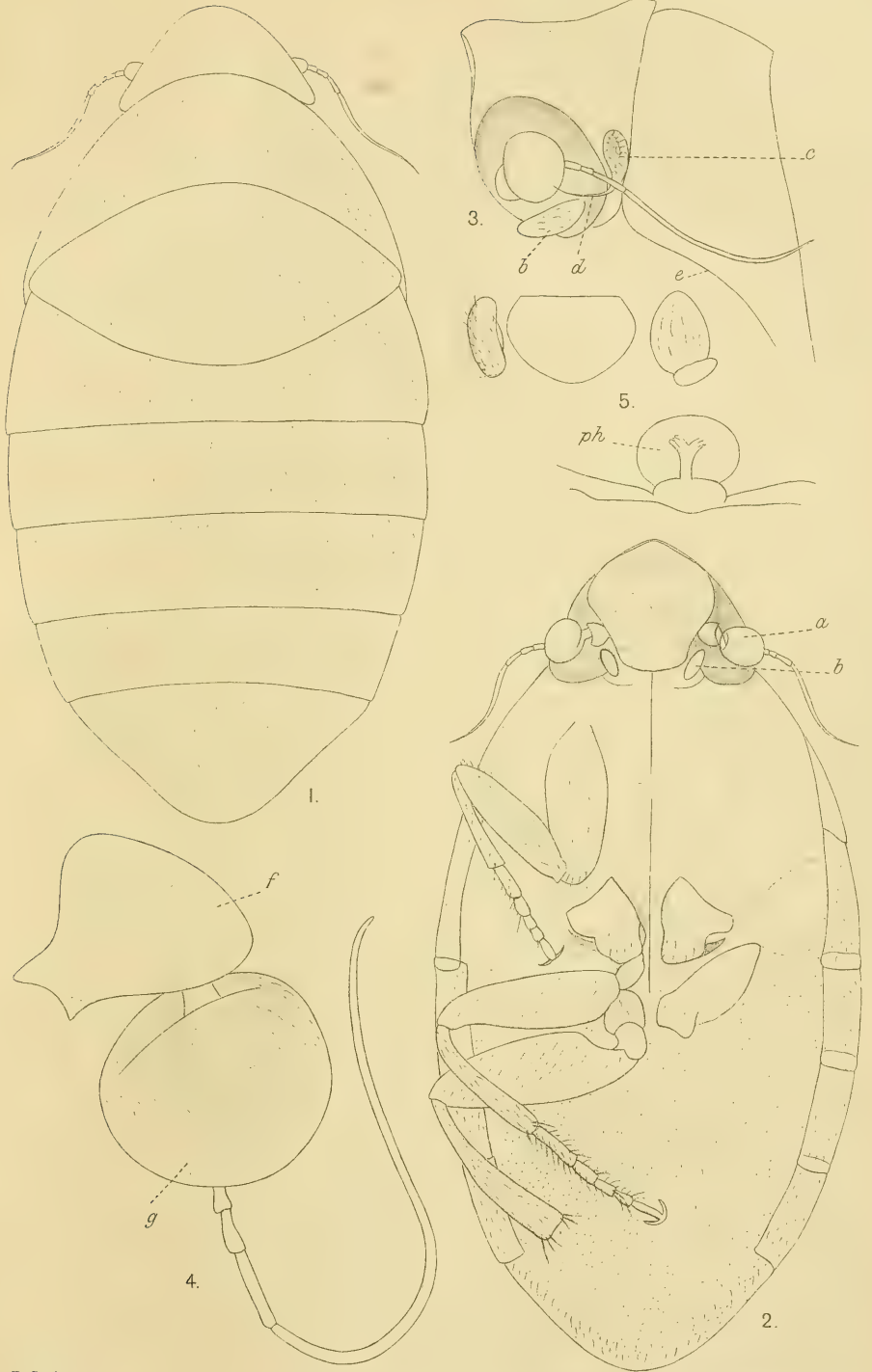
- Cockroach-like appearance.
- Strongly chitinized head and tergites.
- Form of antennæ.
- Form of maxillary palpi.
- Division of thorax into three visible segments.
- Abdomen beneath covered with an unsegmented membranous cuticle.
- Form of legs.
- Absence of tarsal pulvilli.

The following are the characters wherein *Ænigmatistes* differs from *Ænigmatias*:—

- Shape of the head.
- Position of the eyes.
- Absence of ocelli.
- Large size of the pronotum.
- Form of the mesonotum and metanotum.
- Four visible abdominal segments only.

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AENIGMATISTES AFRICANUS.

E. Wilson, lith. & imp.

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EXPLANATION OF PLATE 22.

ÆNIGMATISTES AFRICANUS, gen. et sp. nov.

- Fig. 1. Dorsal view. $\times 45$.
- Fig. 2. Ventral view. $\times 45$. *a*, Antenna; *b*, maxillary palp.
- Fig. 3. Head in side view. $\times 85$. *b*, Maxillary palp; *c*, eye; *d*, seta; *e*, lateral edge of pronotum.
- Fig. 4. Antenna. $\times 250$. *f*, First joint; *g*, second joint.
- Fig. 5. Labrum, maxillary palpi, and hypopharynx. The parts have been separated and the left palpus is shown from the inner aspect. $\times 85$. *ph*, Entrance to pharynx.

The Preservation of Specimens in Australian Museums.

By J. G. OTTO TEPPER, F.L.S.

[Read 21st November, 1907.]

AFTER reading the—for me—very interesting paper “Contribution to the Physiology of the Museum Beetle, &c.,” by Dr. J. Ewart, F.L.S. &c., in No. 195 of the Journal (and the last to hand), I have thought it might not prove amiss if I communicated to you some notes on my experiences relating to the same subject, of which you may make any use you may think it worth while.

For about 24 years I have had the insect collections of the South Australian Museum under my care officially, while at home a considerable botanical collection (mostly Australian) claims my attention privately. Part of the original insect cases (Mrs. Kräusler and Mr. Odewahn, 1850 odd to 1876) were of a rough loose type; the others, though well-made cedar glass cases, were however by no means air-tight, and all were more or less infested with *Anthrenus* and Tineid larvæ, when handed over to me. I cleared them effectively by moistening the specimens with benzol with a camel-hair brush, the youngest larvæ being killed, the others made to quit their lurking places hastily and thus permitting their extermination. After repeated treatments the lepidopterous larvæ, mites, and mould were got rid of for good, while those of the *Anthrenus* only reappeared sparingly and sporadically. However, without some permanent deterrent this method entailed frequent time absorbing inspections, without adequate security against inroads, therefore various substances were successively tried. Camphor proved to be a more or less deceptive expedient, without injuring